# Combat Casualty Care Research Program Priorities

***THOR Remote Damage Control Resuscitation Symposium***
***Miami Beach, FL***
***7-9 October 2024***

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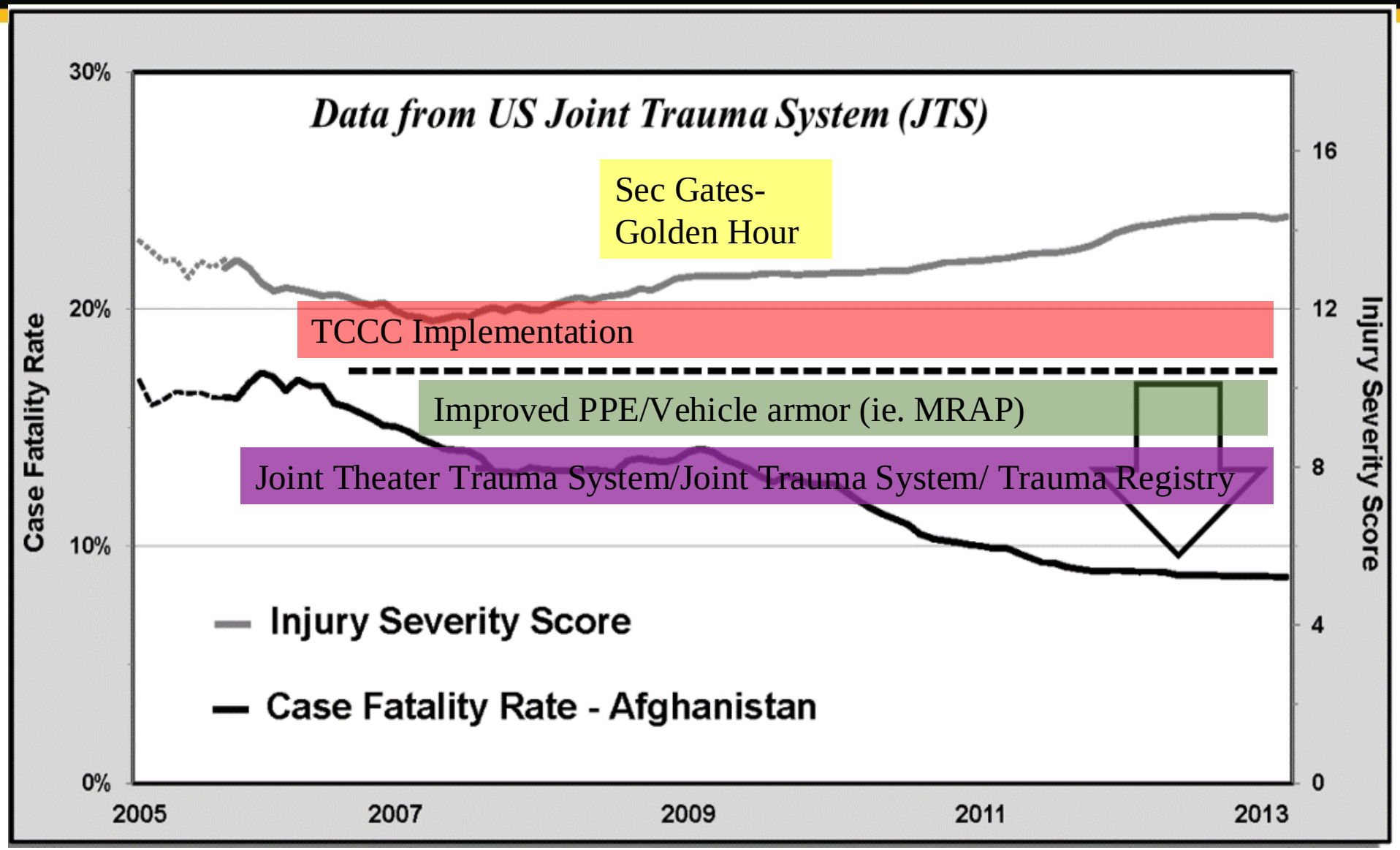
# Disclaimer

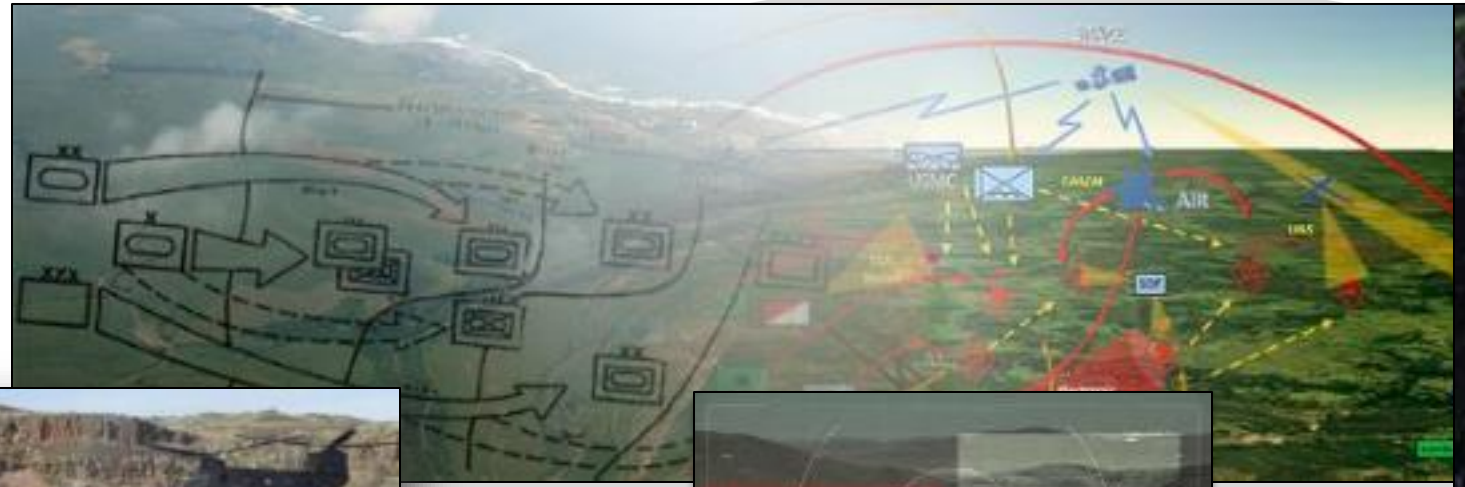
The opinions or assertions contained herein are the private views of the author and are not to be construed as official or as reflecting the views of the Department of Defense, Defense Health Agency, US Navy or US Army.

# Improving combat casualty care over time…



# Future Large Scale Combat Operations






- LACK OF AIR SUPERIORITY
- CONTESTED COMMUNICATIONS/CYBER DEGRADATION
- HIGHLY MOBILE BATTLEFIELD
- MORE LETHAL BATTLEFIELD
- EVOLVING ENVIRONMENTS (Urban, Arctic, Subterranean, etc)
- HIGHLY CHALLENGING LOGISTICS
- ATTRITION OF MEDICAL ASSETS
- LARGE CASUALTY VOLUMES (>10,000/ 60 DAYS)

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# Lessons from Ukraine



- Artillery barrages
- Area denial with unmanned systems
- Cold weather
- Targeting of civilians and medical facilities
- Attrition of medics
- Possible radiation/chemical exposures concerns
- Delayed evacuation

**Ukraine accuses Russia of intensifying chemical attacks on the battlefield**

Reuters

February 9, 2024 9:57 AM EST · Updated a month ago

# Looking farther back…towards to our next conflict

*WWI / WWII*

*Ukraine*

**Lessons learned =**

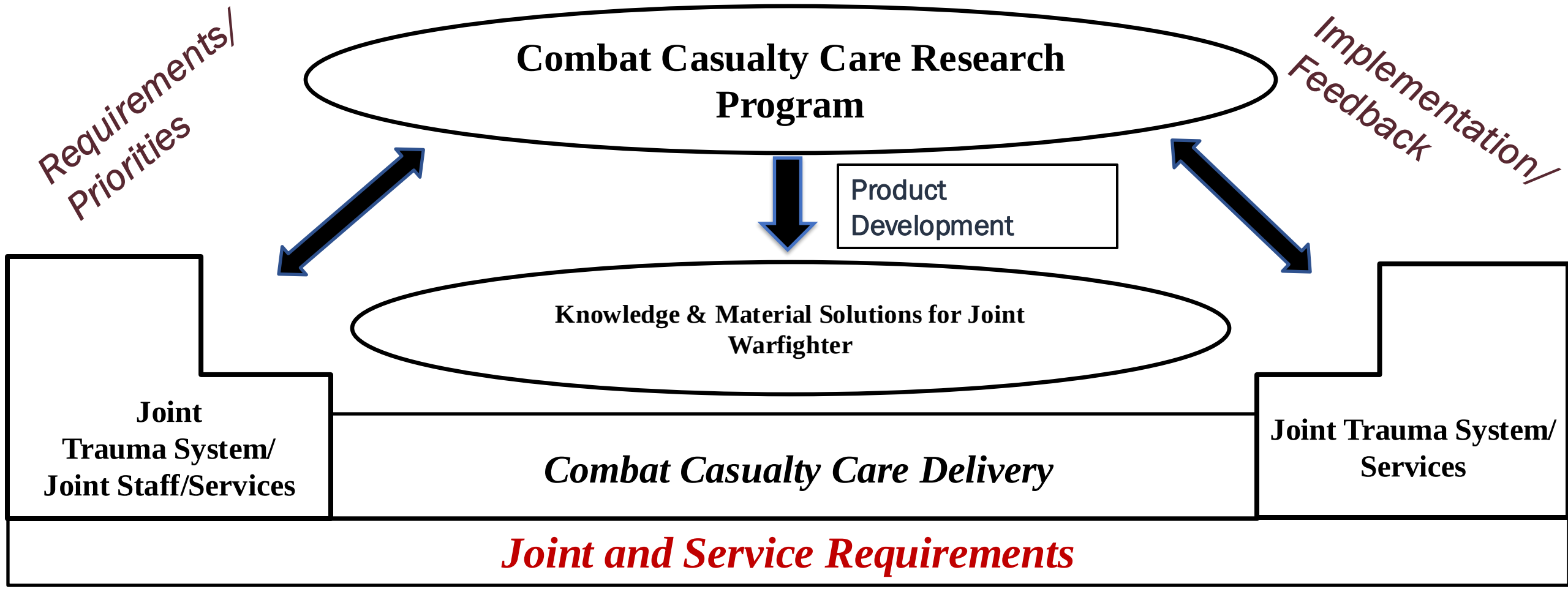
**lessons forgotten and relearned**

# Combat Casualty Care Research Program (CCCRP)

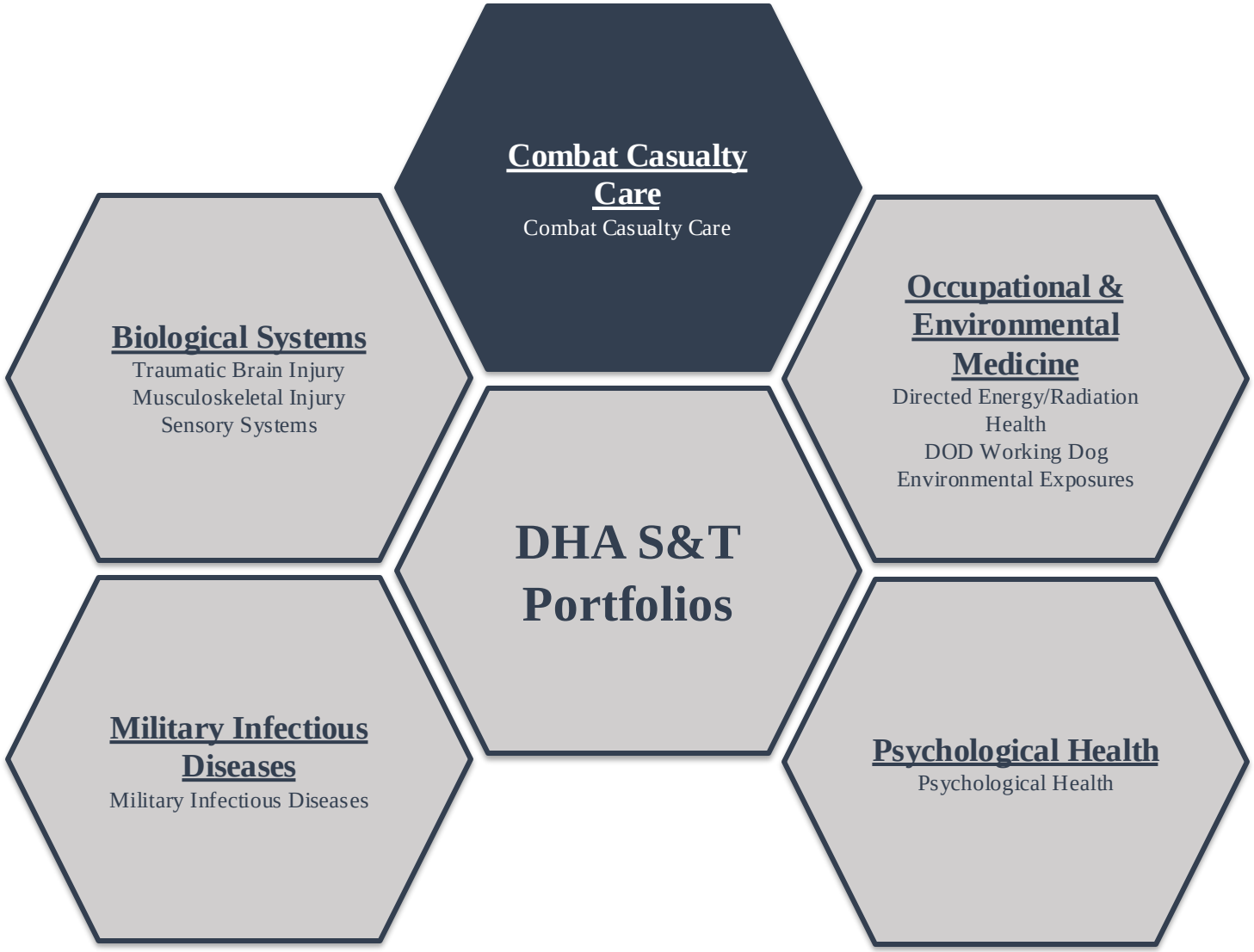
**Vision:** Optimize survival and recovery from combat related injuries in current and future operational scenarios through integrating innovative medical care and advanced technologies.

**Mission**: Drive medical innovation through ***requirements-driven*** development of *knowledge & materiel* solutions for the acute & early management of combat related trauma including point of injury, en-route & facility-based care.

# CCC Research and Development Ecosystem



# New DHA Science & Technology Portfolios



# CCC Portfolio Research Topic Areas

- Tactical Combat Casualty Care
- Resuscitative Strategies & Care
- Care of Complex Injuries & Organ Support
- Forward Surgical Care
- Effects of Transport on Complex Injuries
- En Route Care
- Traumatic Wound & Burn Injuries
- Scalable Triage
- Autonomous Systems
- Virtual Health & Monitoring

# Solutions…Develop the RIGHT stuff

## ***Key Programmatic Principles***

1. Develop medical solutions to most likely physiologic threats
2. Offload medics and warfighters cognitively & physically
3. Return warfighters to fight as expeditiously as possible (if appropriate)
4. Maintain warfighter and unit mobility despite injury (clear the battlefield)
5. Minimizing logistical burden while maximizing capability (size, weight, cube, power, bandwidth, cold chain)

# Automating the Survival Chain




Injury Detection and Triage → Initial Stabilization → Damage Control Surgery

- Casualty localization
- Triage
- Medical Regulating
- Clinical decision support
- Procedural assistance
- Intelligent imaging
- Closed loop systems
- Documentation
- Advanced monitoring
- Prognostication

# Current blood product investments

## Science and Technology

- Transfusion strategies
- Extended shelf life whole blood
- Oxygen carriers
- Freeze dried platelets
- Cold stored platelets
- Platelet extracellular vesicles
- Removal of anti-A/anti-B antibodies
- Dried RBC
- Plasma for burn resuscitation
- Improved blood storage
- Rapid donor screening
- Transfusion adjuncts (Ca, TXA, vasopressin, “anti-shock” drugs)

## Product Development

- Cold stored platelets
- Dried plasma
- Cryopreserved platelets
- Freeze dried platelets
- Rapid blood donor screening
- Lyophilized cryoprecipitate

## Future Priorities

- **Improved blood collection practices** (in theater collection, optimized window between transfusions, rapid donor screening)
- **Surge capacity**
- **System considerations** (supply chain stabilization)
- **Cold chain optimization / elimination** (Longer shelf life, Dried products, “Right” products available for immediate use at the point of need)
- **Novel solutions as “bridge” to blood solution (** Manufactured blood products, Synthetic products with “blood-like” capabilities (volume expansion, oxygenation, hemostasis, etc)
- **Transfusion adjuncts** (TXA, Calcium, “anti-shock” drugs

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# Noncompressible hemorrhage-related efforts

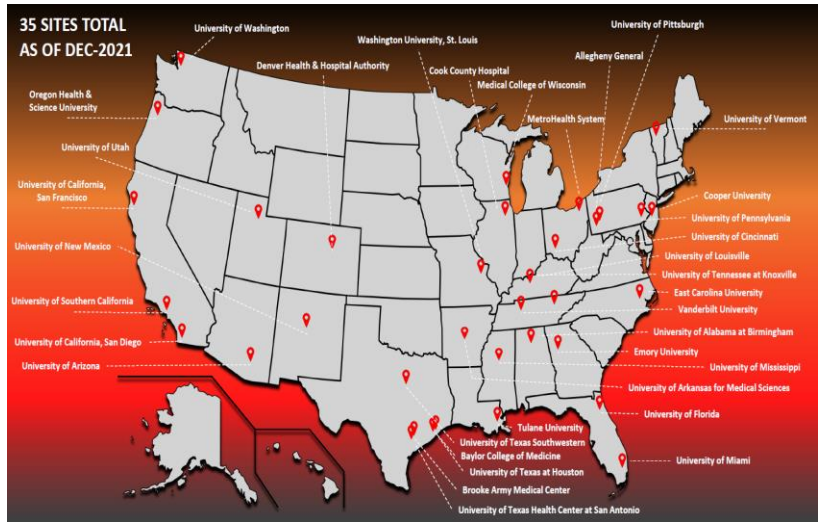
- Hemorrhage detection algorithms/sensors
- Hemorrhage localization
- Semi-autonomous vascular access
- Aortic occlusion devices
- Autonomous (closed-loop) resuscitation
- Next generation hemostatic agents (platelet-derived, nanoparticle, etc.)

# Linking Investigation in Trauma & Emergency Services

LITES



**Mission: To create a research network of US trauma systems and centers with the capability to conduct prospective, multicenter, injury care and outcomes research of relevance to the Department of Defense.**




- **Over 40 trauma center/ prehospital system sites** *(lead site--U Pitt)*
- **9 multicenter studies resuscitation, pain, and airway management**

1) **Epidemiology of trauma in US / mortality analysis**
2) **Shock, whole blood and TBI (SWAT) --** Component vs whole Blood; Hemorrhagic shock (HS) and HS+ Traumatic Brian Injury (TBI)
3) **Prehospital Airway Control Trial (PACT)—**standard practice vs supraglottic airway
4) **Cold Stored Platelet Early Intervention (CriSP-HS and CriSP-TBI)**
5) **Prehospital Analgesia Intervention (PAIN) –** IV fentanyl vs ketamine
6) **Type O Whole blood and assessment of Age early Resuscitation (TOWAR) --** <14day old vs >14day old
7) **Desuvia Early Evaluation of Pain (DEEP) –** standard therapy vs SL sufentanil in injured patients
8) **Calcium and Vasopression in Early Resusitation (CAVALIER)**
9) **Plasma for Burn**

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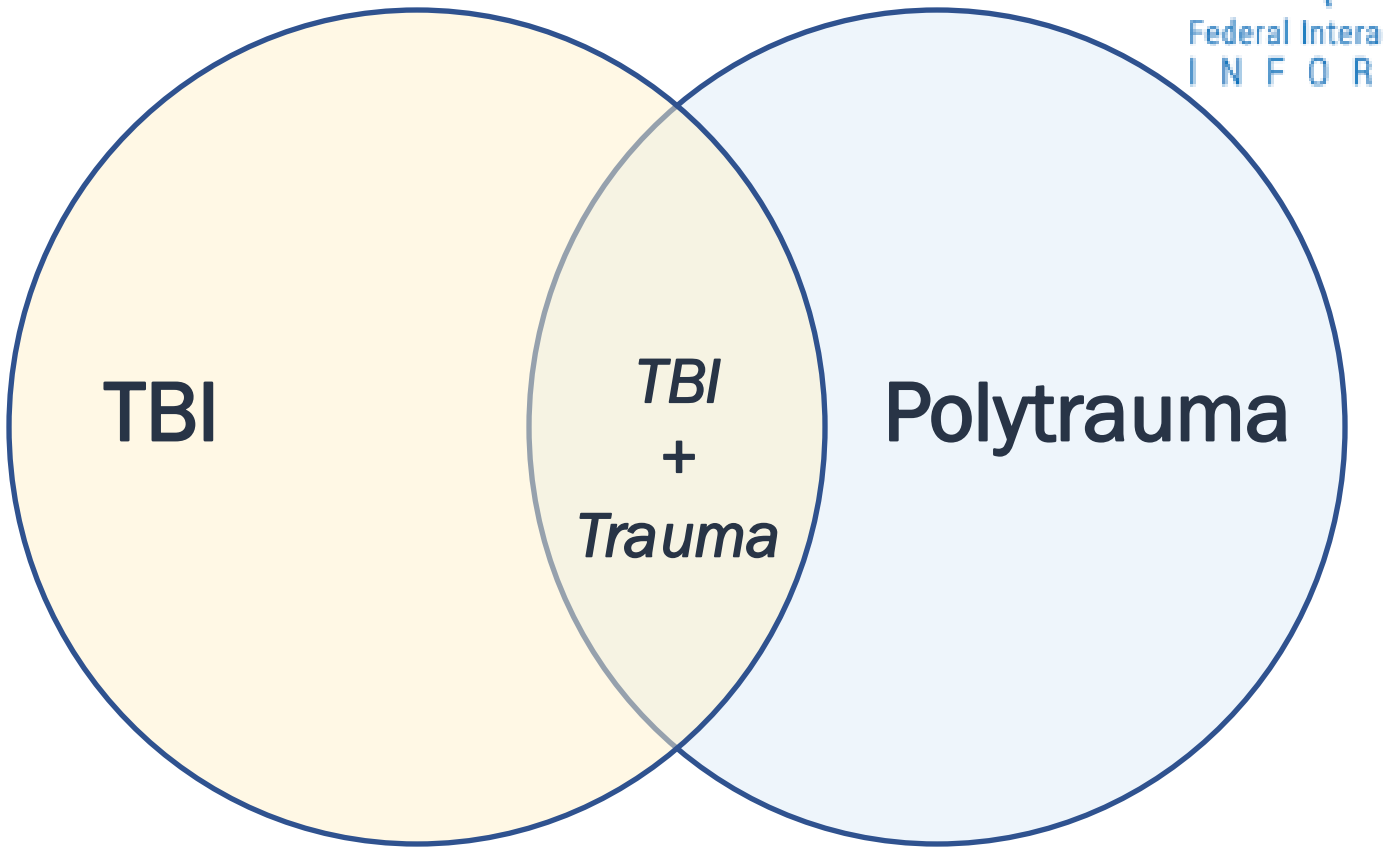
# National Trauma Research Repository


FITBIR
Federal Interagency Traumatic Brain Injury Research
INFORMATICS SYSTEM




https://ntrr-nti.org/
https://fitbir.nih.gov/

CCCRP Combat Casualty Care Research Program
NIH
CNTR COALITION FOR NATIONAL TRAUMA RESEARCH

# Partnering with Ukraine for Trauma Care and Research (FY23 National Defense Authorization Act, Section 736 and FY24 National Defense Authorization Act, Section 721)

The Secretary of Defense shall seek to enter into a partnership with the appropriate counterpart from the Government of Ukraine for the establishment of a joint program on military trauma care and research, consisting of:

- Sharing lessons learned from the Russo-Ukraine War
- Joint conferences and exchanges with military medical professionals from Ukraine and the US
- Collaboration with the armed forces of Ukraine on matters relating to health policy, health administration, and medical supplies and equipment, including through knowledge exchanges
- Conduct of joint research and development on the health effects of new and emerging weapons
- Entrance into agreements with military medical schools of Ukraine and the Uniformed Services University of the Health Sciences forreciprocal education programs under which students receive specialized military medical instruction
- Provision of support to Ukraine for facilitating the establishment of a program substantially similar to the Wounded Warrior Program in Ukraine
- Provision of training to the armed forces of Ukraine in the following areas:
  - Health matters relating to chemical, biological, radiological, nuclear and explosive weapons
  - Preventive medicine and infectious disease
  - Post traumatic stress disorder and Suicide prevention
  - Traumatic brain injury, Rehabilitation, Extremity injury
- The maintenance of a list of medical supplies and equipment needed
- Such other elements as the Secretary of Defense may determine appropriate

# Casualty Care Assessment of Russo-Ukraine War



**Objective:** Assess the UKR trauma system, share actionable recommendations for Ukraine and develop lessons learned for the US military and NATO partners

**Description:** Qualitative assessment of Ukraine medical system via:

1)key informant interviews;

2)targeted symposia;

3)Surgical skill courses for Ukraine surgical teams

**Scope:** Assessment of both civilian and military health system. Strong support from Ukraine Ministries of Health and Defense.

**Limitations:** Study conducted in Warsaw, Poland

Henry M. Jackson Foundation for the Advancement of Military Medicine

aspenmedical

USU Uniformed Services University

# Symposium topics

- **Workshop engagements in Warsaw, Poland**
  - Trauma Registry Opportunities
  - Hemostatic Resuscitation
  - Rehabilitation: Maintaining Readiness
  - Evacuating the Injured
  - Tourniquet Conversion and Replacement
  - Ukraine Research Needs/Opportunities
  - Brain Health
  - Telemedicine
  - Medical Logistics

***Future topics may include:***

*Mass Casualty/triage*
*Medical care in the drone era*
*DNBI*
*Wounds*
*Cold weather*
*Medical provider resiliency*

# What's next?

**US/Ukraine Military Medical Research Symposium**

**February 2024**

- Ukraine research capabilities and past experiences
- US and Ukraine research needs
- US and Ukraine regulatory environments
- Data sharing limitations
- US/NATO partnership opportunities
- Established process for bilateral review of future US DoD- funded research projects within Ukraine

**12 Studies now have been funded:**

- Severe infections/Sepsis
- Wound infection / management
- Pilot trauma registry /Tourniquet usage
- Traumatic brain injury
- Partial REBOA in far forward environment
- Hemorrhage Control
- Mental health training
- Post traumatic headaches
- Post traumatic stress disorder
- Training partnerships / exchanges
- Mass casualty/triage
- Gender violence during conflict

# Future Meetings

**Mark your calendars!**

We are pleased to announce the upcoming **Platelet and Platelet-like Products State of Technology Meeting**, hosted by DoD Combat Casualty Care Research Program (CCCRP), BARDA Radiation/Nuclear Medical Countermeasures Program, NHLBI Division of Blood and Blood Diseases, and Medical Technology Enterprise Consortium (MTEC).

This meeting will take place in **Bethesda, Maryland**, from **February 4-6, 2025**.


A Public Discussion of Evidence Based Guidelines for

**Emergency Transfusion in Females With Childbearing Potential:** Mitigating the Risks of Hemolytic Disease of the Fetus and Newborn

MEDICAL RESEARCH AND DEVELOPMENT COMMAND

# Funding Opportunities

**Defense Medical Research and Development Program**
(Executed by CDMRP on behalf of core programs)

USAMRAA

CDMRP

**US Army Medical Research and Development Command**
**Broad Agency Announcement**
**Targeted Funding Opportunities**

**Medical Technology Enterprise Consortium**
**(Other Transactional Authority)**

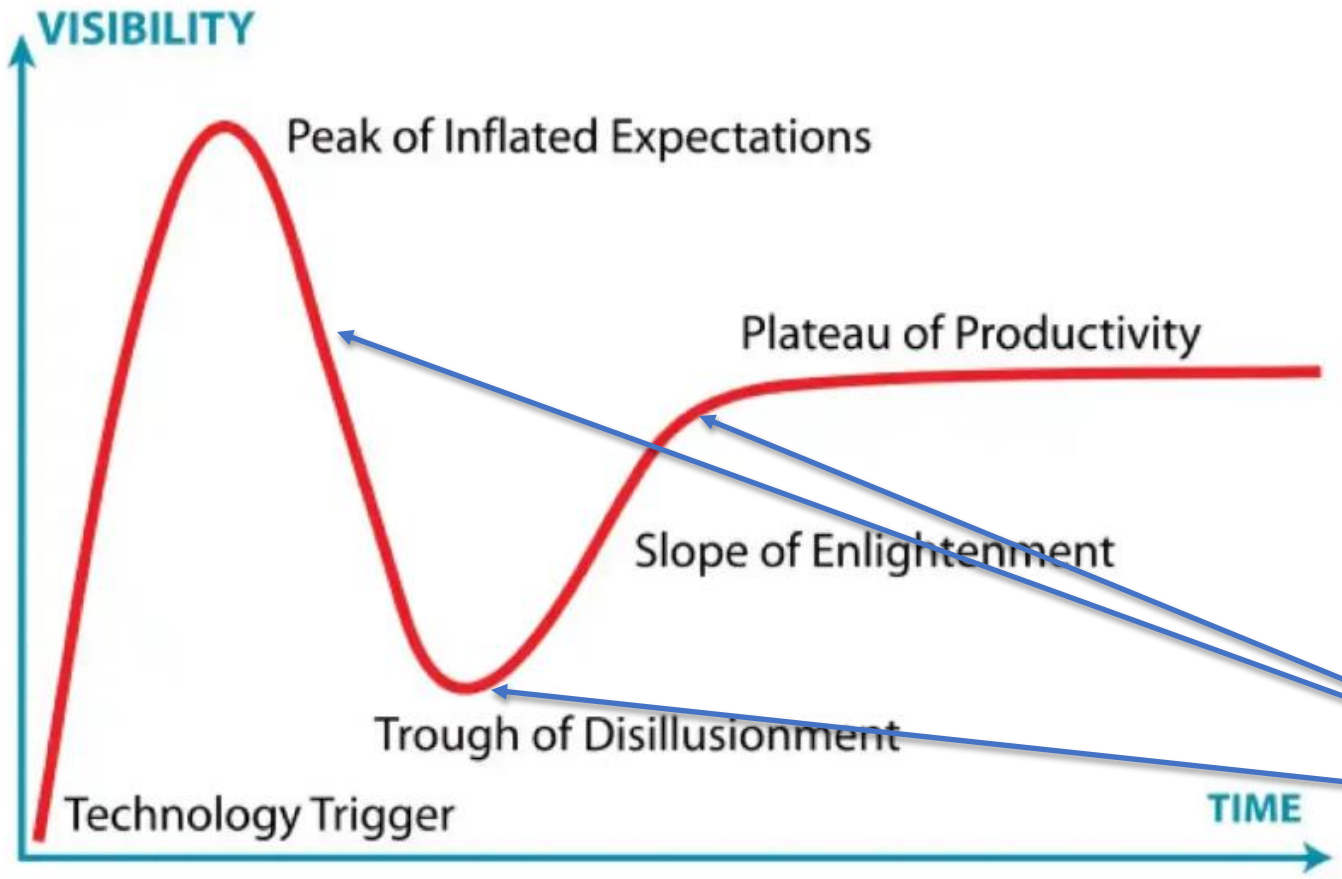
MTEC

**Linking Investigations in Trauma and Emergency Services**
**Trauma Clinical Research Network**

LITES

# Striving for transformational change






**"An invention has to make sense in the world it finishes in, not the world it started."**
**-Tim O'Reilly**

**Where does REBOA or intra-abdominal foam technologies fall?**

**Today?**
**5 years ago?**
**5 years from now?**

# Questions?

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**Additional information CCCRP/JPC-6 funding opportunities can be found on the websites below:**

- ccc.amedd.health.mil
- www.grants.gov
- cdmrp.health.mil
- mtec-sc.org
- Sam.gov